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JANUARY 1974, No. 1

FISHING INFORMATION

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

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NATIONAL MARINE FISHERIES SERVICE
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LA JOLLA, CALIFORNIA 92037

FISHING INFORMATION

JANUARY 1974, No. 1

B. J. Rothschild, Director, SOUTHWEST FISHERIES CENTER
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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) a narrative description of subsurface temperature structure for parts of the North Pacific, 4) charts of winds and pressures for the eastern North Pacific, 5) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 6) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. This is a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

L. E. Eber, Leader
Fishery Information Systems
Southwest Fisheries Center
La Jolla, California

Submitted for publication - February 19, 1974

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L. Eber (Figures 4 and 6), F. Miller (Figures 9 and 10)
J. Renner (Figures 1, 2, 3, 5, 7, and 8), J.F.T. Saur (Figures 11 and 12)

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National Ocean Survey, Pacific Marine Center, Seattle, Washington
Pacific Environment Institute, Fisheries Research Board of Canada, West Vancouver, British Columbia, by L.F. Giovando from observations by S.G. Westhaver at Langara Island Light; D.L. Kupillas at Cape St. James Light; J. Coldwell at Kains Island Lightstation; O.A. Edwards at Amphitrite Point Light
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Expendable bathythermograph observations are made by the mates of the S.S. Chevron Califorina of Chevron Shipping Co. The data are processed under supervision of Dr. D.R. McLain at the NMFS Pacific Environmental Group Monterey, using computer facilities of the Fleet Numerical Weather Center. The project is partially supported by the National Science Foundation and the Office of Naval Research under Government Order NAonr-9-74.

Sea Surface Temperature and Environmental Conditions

L. EBER AND F. MILLER

Eastern North Pacific

Seasonal cooling continued to be below normal in central portions of the eastern North Pacific during January 1974. Sea temperature decreases from the previous month were minimal in the region 145°-150°W, between latitudes 40° and 45°N. Negative departures from long term mean temperatures in the central region consequently diminished in value or became positive (Figure 5). Cooling was slightly greater than normal in the northern part of the Gulf of Alaska, in the area northwest of Hawaii between 25° and 34°N and off southern California.

The tendency toward relatively warmer conditions in central portions of the eastern North Pacific has persisted since last October, when surface waters were generally cooler than normal.

Atmospheric sea level pressures were below normal in the area northwest of Hawaii, in January 1974, and above normal along the coasts of Alaska and British Columbia (Figures 1 and 2). This pattern of anomalous pressure was associated with strong southerly winds from 135°-160°W, between latitudes 35° and 50°N, which contributed to the retardation of seasonal cooling in this region.

Western North Pacific

Sea surface temperature conditions in the western North Pacific showed little change from December 1973 to January 1974. Departures from normal continued to be negative in most of the region west of 160°E between 25° and 37°N, except near the Japanese Islands (Figure 6). Positive departures prevailed east of 160°E and north of 35°N, except in a zone extending along the Kuril Islands and the east coast of Kamchatka.

Eastern Tropical Pacific

In January 1973, sea surface temperatures over the eastern tropical Pacific reflected the typical seasonal cooling in the northern hemisphere and warming in the southern hemisphere (Figure 9). The temperature anomaly pattern (Figure 10) shows that in most of the eastern tropical Pacific east of 150°W temperatures continued to be below the long term means.

The cool surface temperature conditions can be traced back as far as August 1973 when rapid cooling took place in the equatorial region (5°N-5°S) and along the coast of South America. Between August and September 1973, temperatures dropped to more than 8°F (4.4°C) below normal off the southern part of Baja California. From September-December 1973, the areas of negative departures from normal spread gradually over the eastern tropical Pacific. However, the largest persistent negative anomalies have remained in the region of equatorial upwelling and along the Peru Current.

In the southern hemisphere, steady southeast trades, with slightly stronger than normal wind speeds, have maintained vertical mixing and upwelling in the Peru Current and along the equator since the beginning of the southern hemisphere winter of 1973.

North of the equator unusually strong northeast trades persisted in December and January west of 105°W between 5°N and 15°N, which induced considerable vertical mixing in the surface

layers. To the west of Baja and in the Gulf of Tehuantepec, surface winds were light for January and surface temperatures were returning to normal. Temperatures in and west of the Costa Rica Dome (a cold water feature at $10^{o}N$, $90^{o}W$) were similar to those in December and reflected active vertical mixing which was enhanced by steady easterly winds of 12-15 knots during most of January.

Subsurface Temperature Structure in the Northeast Pacific Ocean

J.F.T. SAUR

Observations for the sections of subsurface temperature structure presented in this issue, Figures 11 and 12, were made on two voyages of the tanker, Chevron California. The only section available between Honolulu and the southern California area (Figure 12) was made in late December and lay along the route from Honolulu to Encina Power Station, Carlsbad, California, about 30 miles north of San Diego. Most of the track is very nearly the same as that to Los Angeles, except near southern California where it is displaced about 45 miles to the south. Station 35 was located just off the southeast tip of San Clemente Island. The section between San Francisco and Honolulu (Figure 11) was made in mid-January. On this voyage the tanker followed a rhumb line course which near mid-section, lies about 90 miles south of the great circle route. (The horizontal axes on the sections are scaled to great circle routes. A description of the new format for the graphs and sections was given in the December 1973, No. 12 issue of Fishing Information.) The geographic locations of the observations are depicted on the chart in the upper left of each figure. However, longitude as read from the scale along the top of the vertical section may be up to 1° off at mid-section.

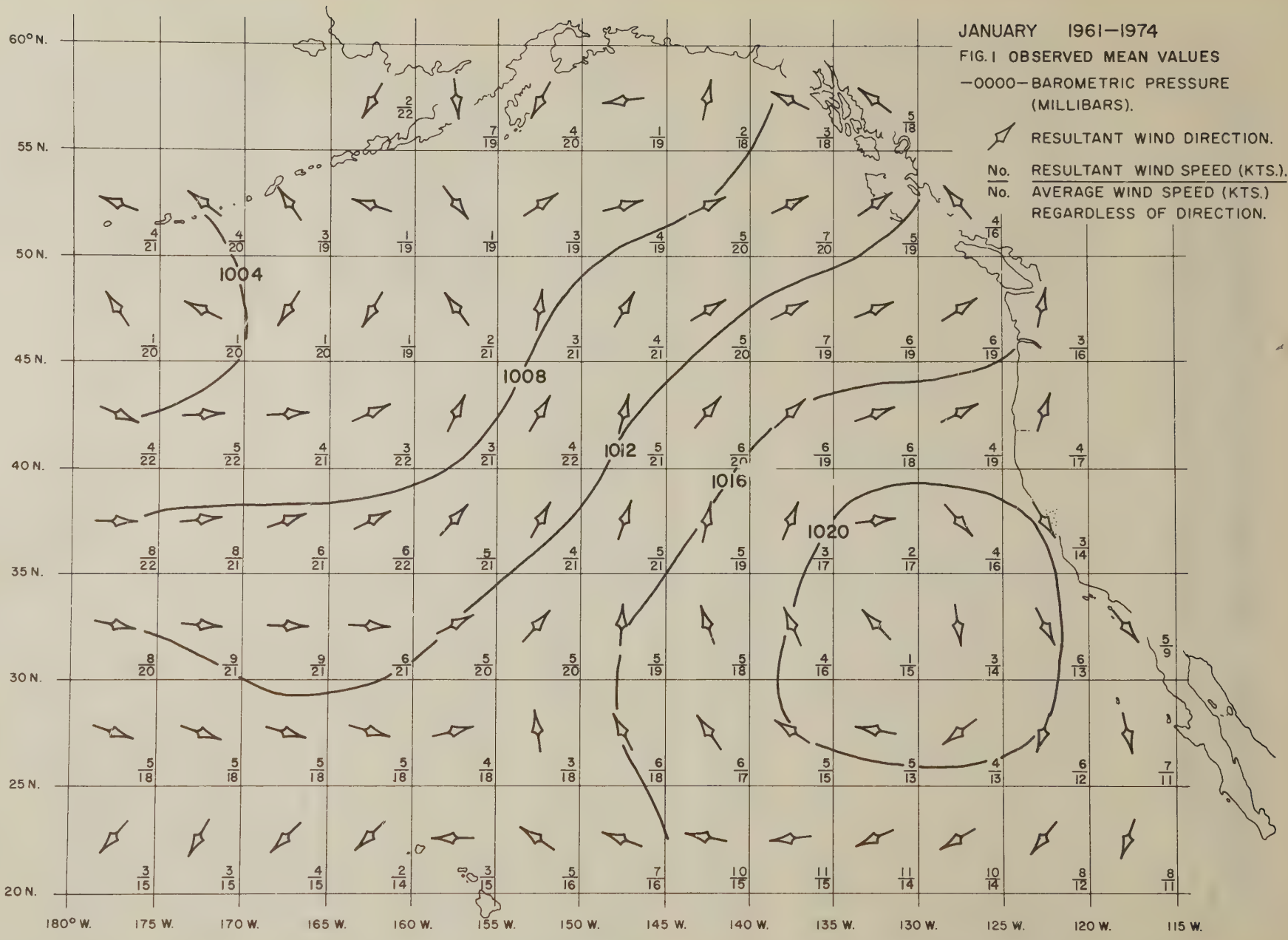
In general, little change in subsurface temperature structure is readily apparent from December to January. There was slightly more than normal loss of heat from the ocean to the atmosphere. However, the heat loss was distributed through a deep mixed layer so that the temperature change was generally less than 1°C (see profiles in Figures 11 and 12).

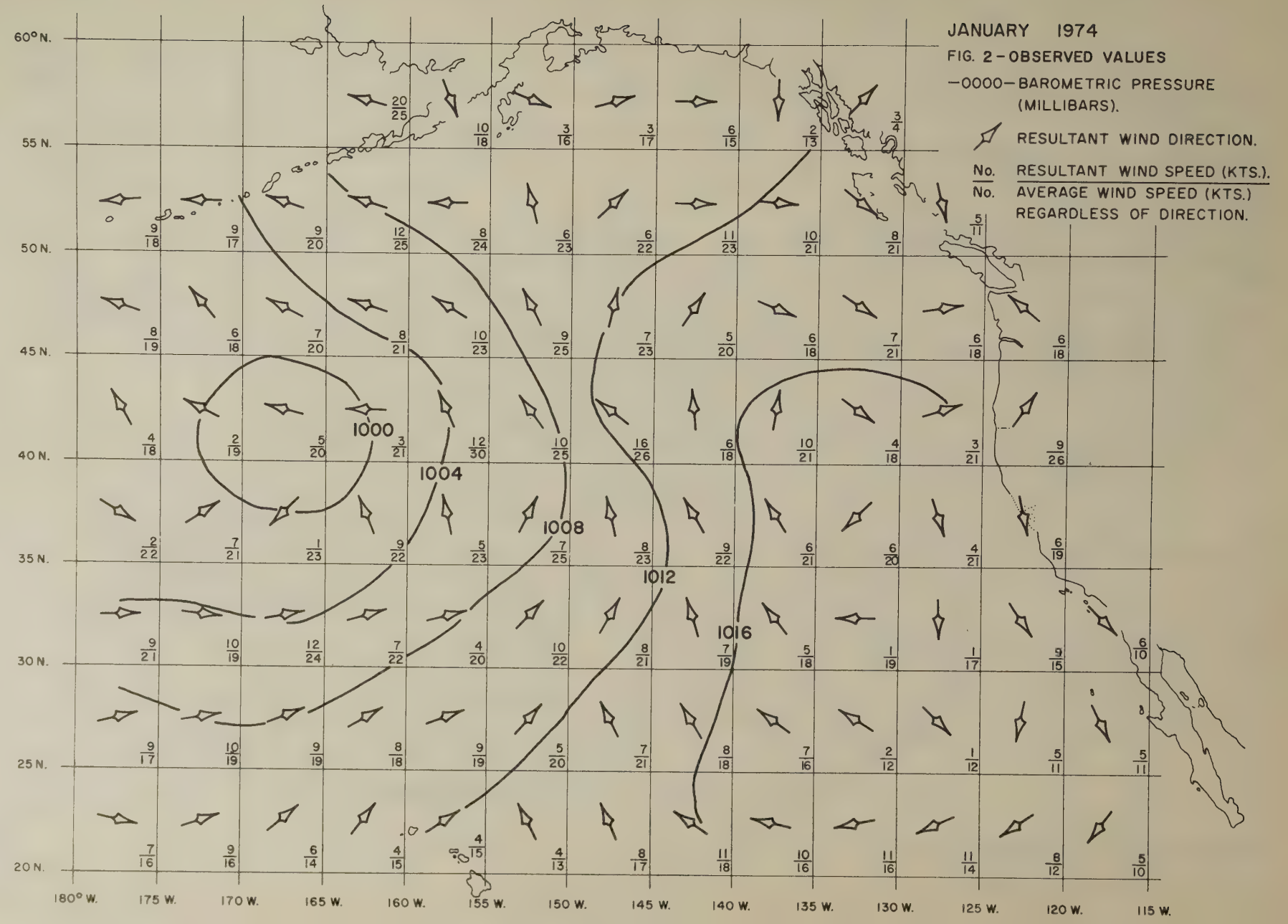
Along the Honolulu-Carlsbad route (Figure 12) the low salinity axis of the California Current appeared at observation 31 (124°W). The colder higher salinity surface water east of there is related to the southern California Eddy, a counterclockwise circulation which occurs in the region southeast from Pt. Conception to northern Baja California. The rapid westward increase in surface salinity through observation 28, and the occurrence there of a subsurface temperature inversion, indicate the outer boundary of the California Current waters lies near 127°W on this route. The Transition Zone extends westward to about 135°W, between observations 21 and 22.

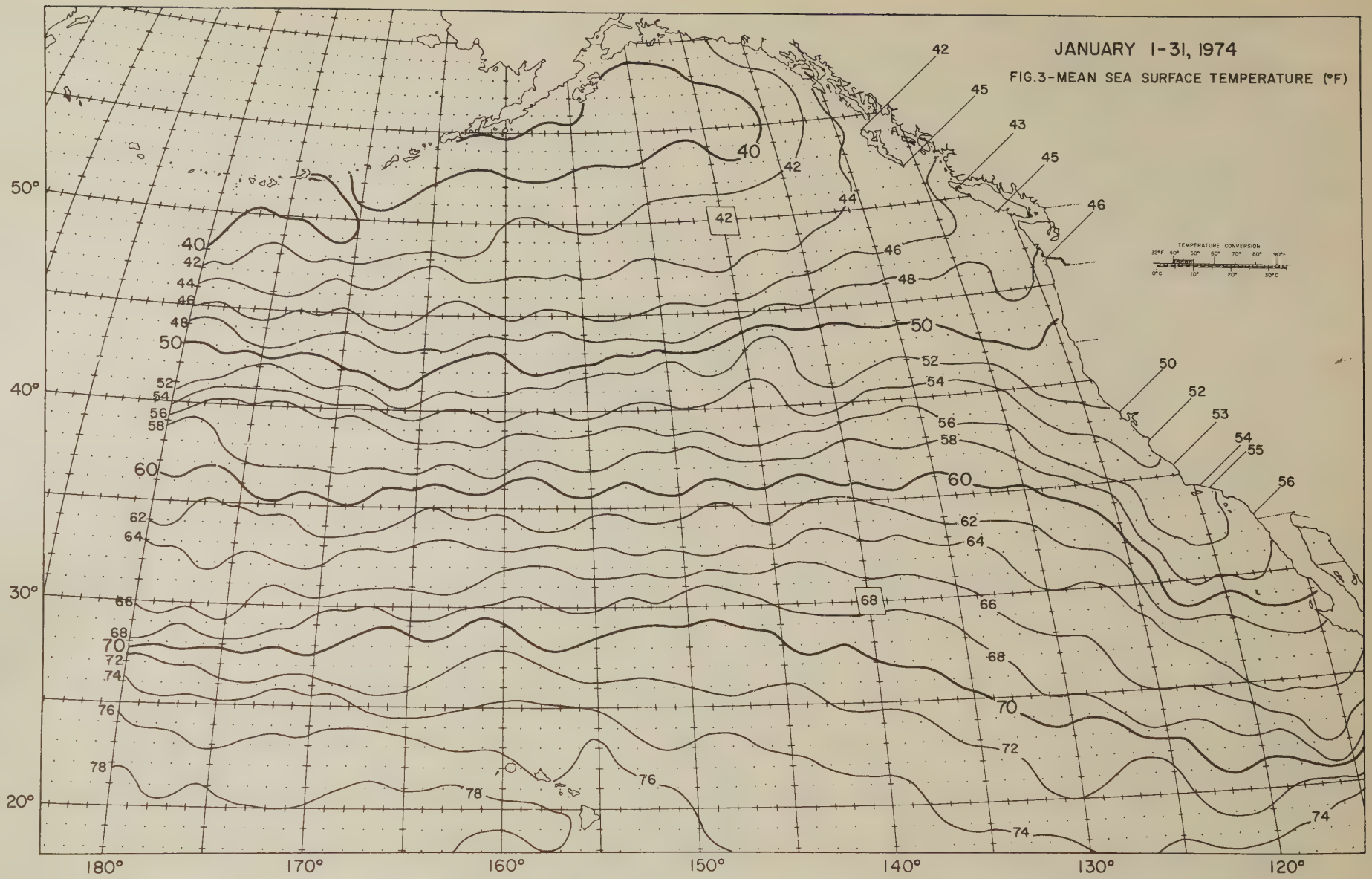
Interpretation of the mid-January section on the Honolulu-San Francisco route (Figure 11) must be made without benefit of surface salinity data which are not yet available. The westward increase in surface and mixed layer temperature and downward slope of the subsurface isotherms begins at the first observation, near the edge of the continental shelf off San Francisco. Thus, these data do not indicate the presence of the north flowing coastal Davidson Current, sometimes observed in the winter season. The first temperature inversions in the vertical profiles occur in observations 7 and 8, indicating that the boundary between California Current waters and the Transition Zone lies near 131°W, or about 450-500 nautical miles from the central California Coast. The western boundary of the Transition Zone, with the Eastern North Pacific Central (ENP) water, apparently lies east of observation 15, at approximately 139°W.

Mixed layer depths were about 10-15 meters deeper than in December. The shallowest mixed layers (less than 70 m) occurred in the eastern part of the California Current. The deepest layers, 108-119 m, were observed at observations 15 (139°40'W) through 18 (112°45'W) on the San Francisco-Honolulu route, Figure 11. These deep mixed layers were located in ENP waters just west of the Transition Zone, and appear to be a wintertime characteristic of the thermal structure.

The 16°-19°C (61°-66°F) temperature range normally recedes westward during the winter. By mid-January 1974 the 16°-19°C range at the surface, along the San Francisco-Honolulu route, nearly coincided with the Transition Zone. Depths of the 16° isotherm in this zone ranged from 80-150 m. The 16°-19°C range was entirely below the surface in the ENP Central water on both routes.

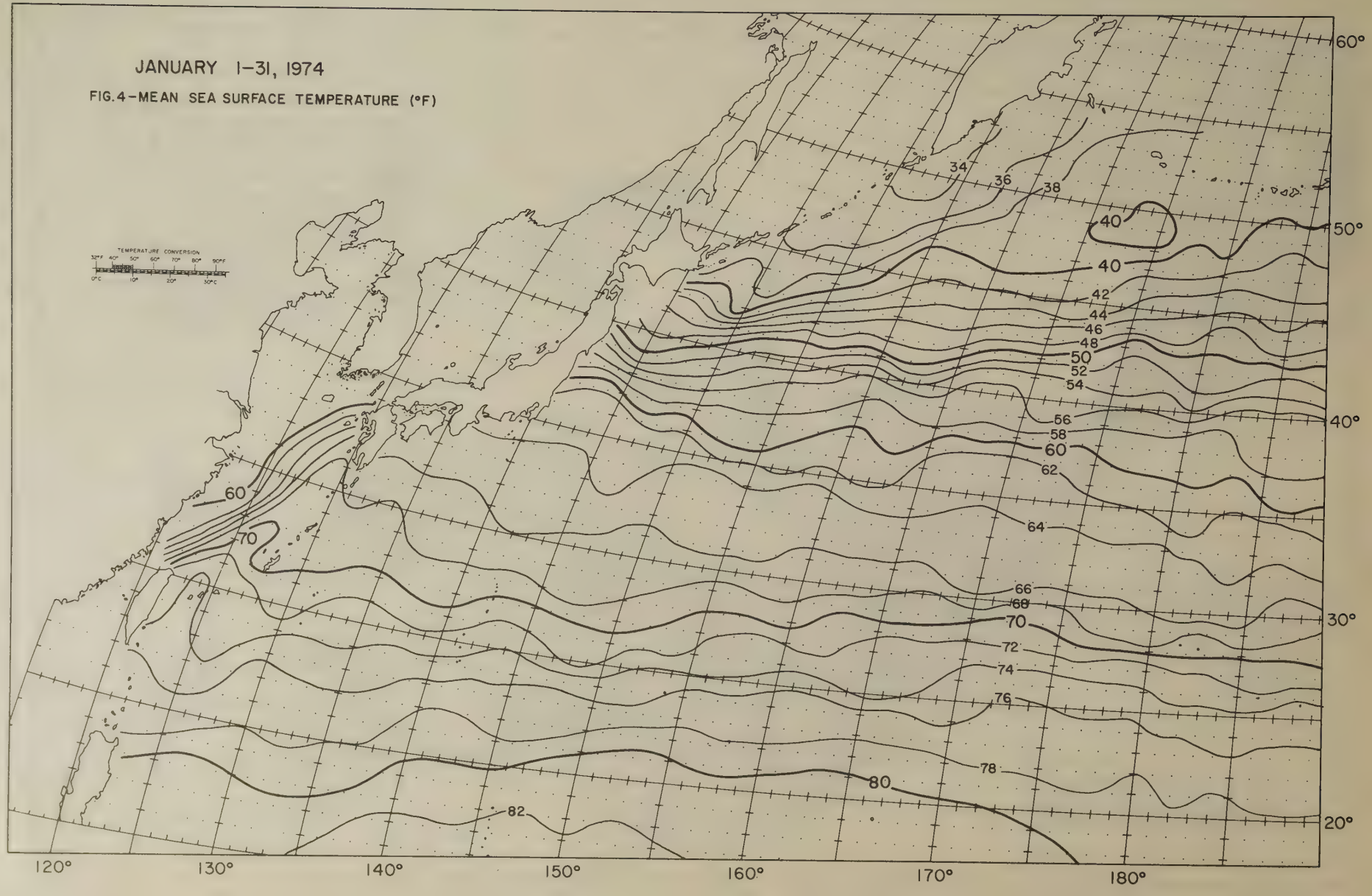

JANUARY 1961–1974
FIG. 1 OBSERVED MEAN VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.).
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

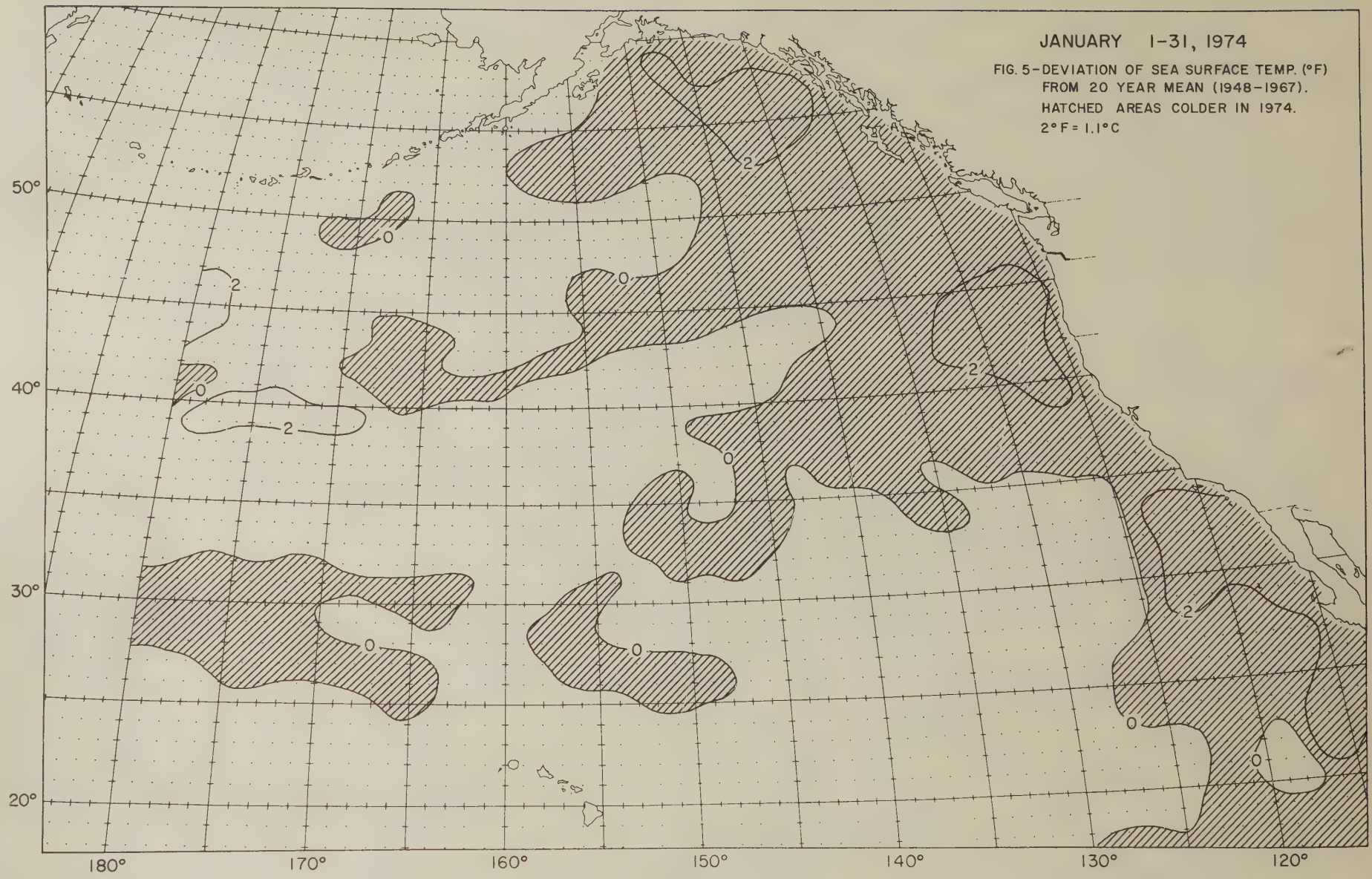

JANUARY 1974
FIG. 2 - OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.).
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1000
1004
1008
1012
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

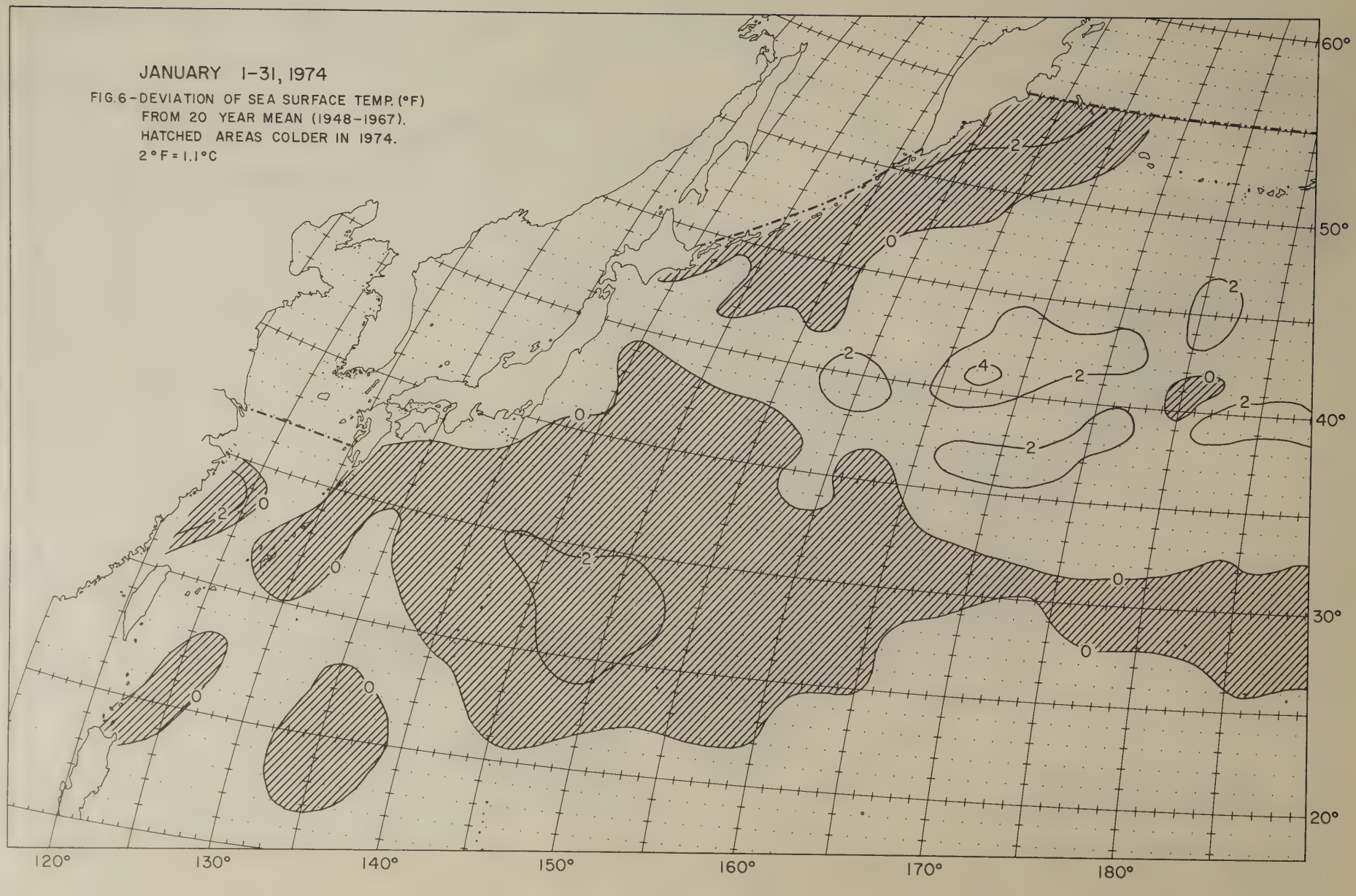

JANUARY 1-31, 1974
FIG.3-MEAN SEA SURFACE TEMPERATURE (°F)
TEMPERATURE CONVERSION
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

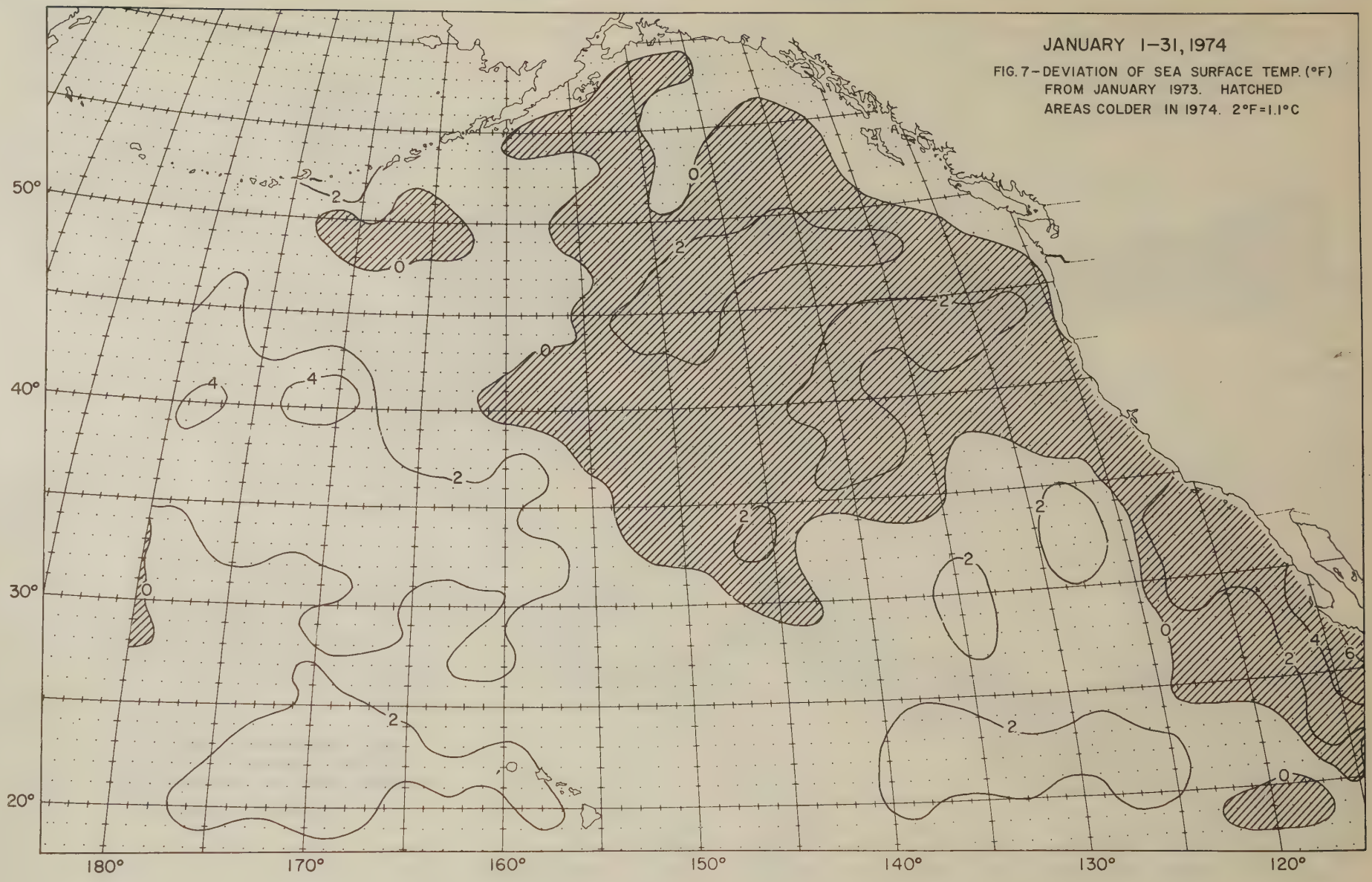
JANUARY 1–31, 1974

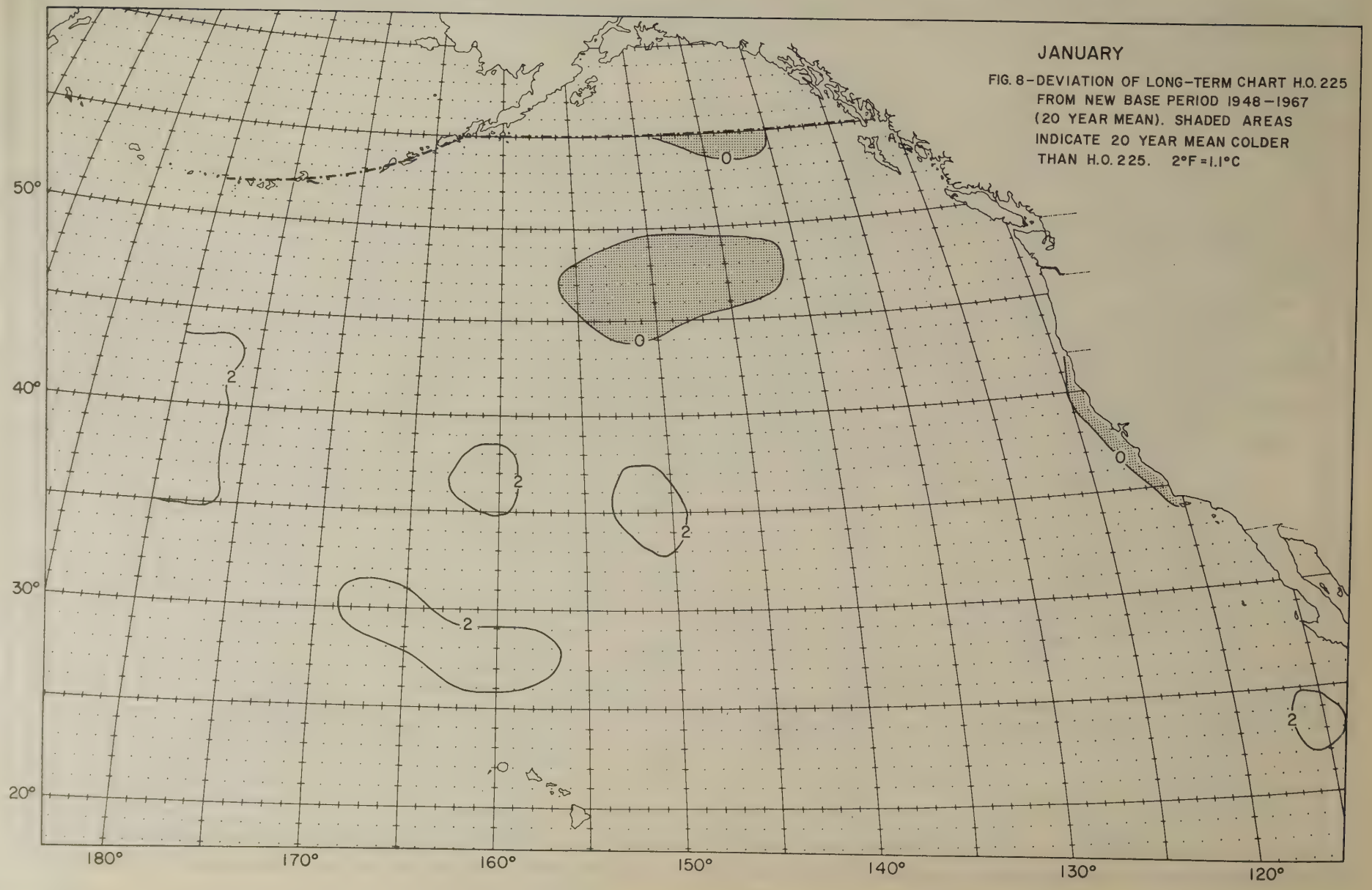
FIG. 4–MEAN SEA SURFACE TEMPERATURE (°F)

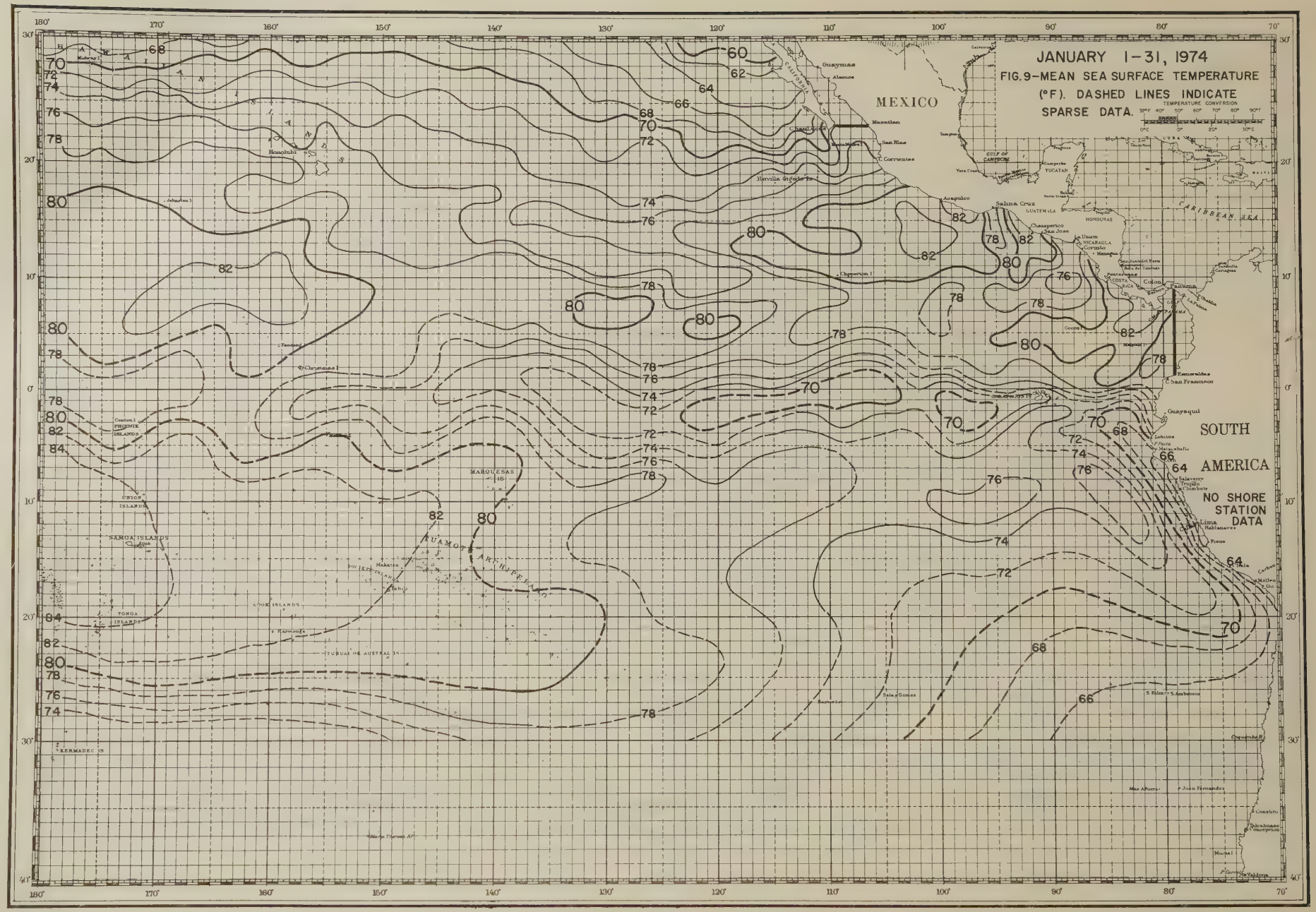



JANUARY 1-31, 1974
FIG. 5-DEVIATION OF SEA SURFACE TEMP. (°F) FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1974.
2°F = 1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
2


JANUARY 1-31, 1974
FIG.6-DEVIATION OF SEA SURFACE TEMP.(°F)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1974.
2°F = 1.1°C
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°
0
2
4


JANUARY 1–31, 1974
FIG. 7 – DEVIATION OF SEA SURFACE TEMP. (°F) FROM JANUARY 1973. HATCHED AREAS COLDER IN 1974. 2°F = 1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
2
4
6


JANUARY
FIG. 8 – DEVIATION OF LONG-TERM CHART H.O. 225 FROM NEW BASE PERIOD 1948–1967 (20 YEAR MEAN). SHADED AREAS INDICATE 20 YEAR MEAN COLDER THAN H.O. 225. 2°F = 1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
0
0
0
0
2
2
2
2
2


JANUARY 1-31, 1974
FIG. 9-MEAN SEA SURFACE TEMPERATURE (°F). DASHED LINES INDICATE SPARSE DATA.
TEMPERATURE CONVERSION
MEXICO
SOUTH AMERICA
NO SHORE STATION DATA
CARIBBEAN SEA
HAWAIIAN ISLANDS
MARQUESAS
SAMOA ISLANDS
TUAMOTU ARCHIPELAGO
TONGA ISLANDS
COOK ISLANDS
UNION ISLANDS
PHOENIX ISLANDS
KERMADEC IS.
Guaymas
Mazatlan
San Blas
Acapulco
Salina Cruz
Chiapas
Honolulu
Lima
Guayaquil
Callao
Valparaiso
Juan Fernandez
Easter I.

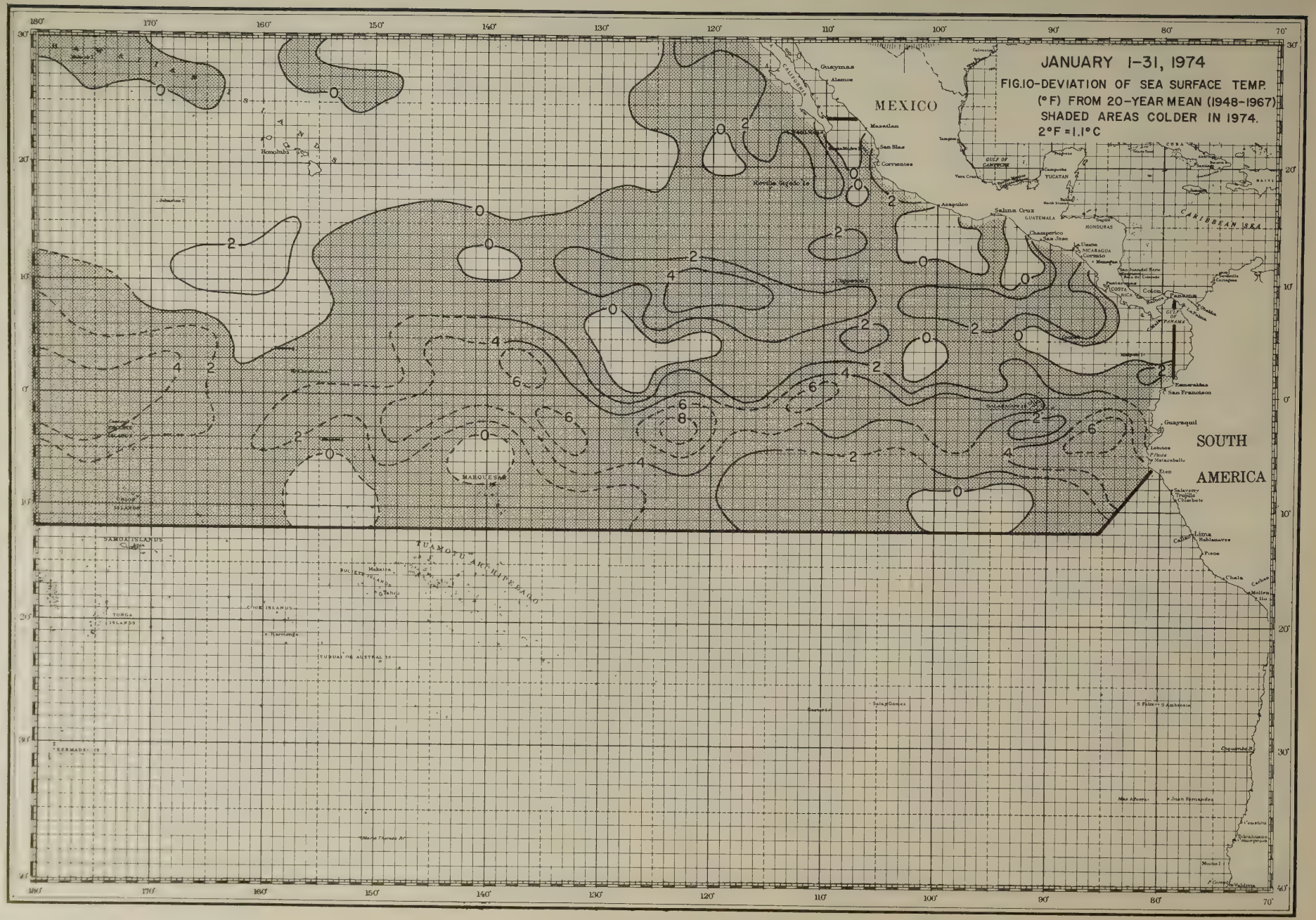
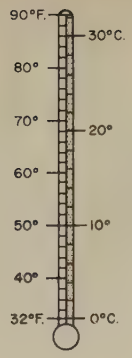

JANUARY 1-31, 1974
FIG.10-DEVIATION OF SEA SURFACE TEMP. (°F) FROM 20-YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1974.
2°F = 1.1°C
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
Guaymas
Mazatlan
San Blas
Acapulco
Salina Cruz
Guayaquil
Lima
Callao
Chala
Pisco
Salaverry
Trujillo
Chimbote
Paita
Talara
Tumbes
Manzanillo
Colon
Buenaventura
Esmeraldas
San Francisco
Lobitos
Puerto Pizarro
Isla Macabi
Isla Matancabello
Isla Lobos de Afuera
Isla Lobos de Tierra
Isla Foca

FIGURE 11



HONOLULU — CARLSBAD, CA.

DECEMBER 23–29, 1973

SS CHEVRON CALIFORNIA

VOYAGE 52

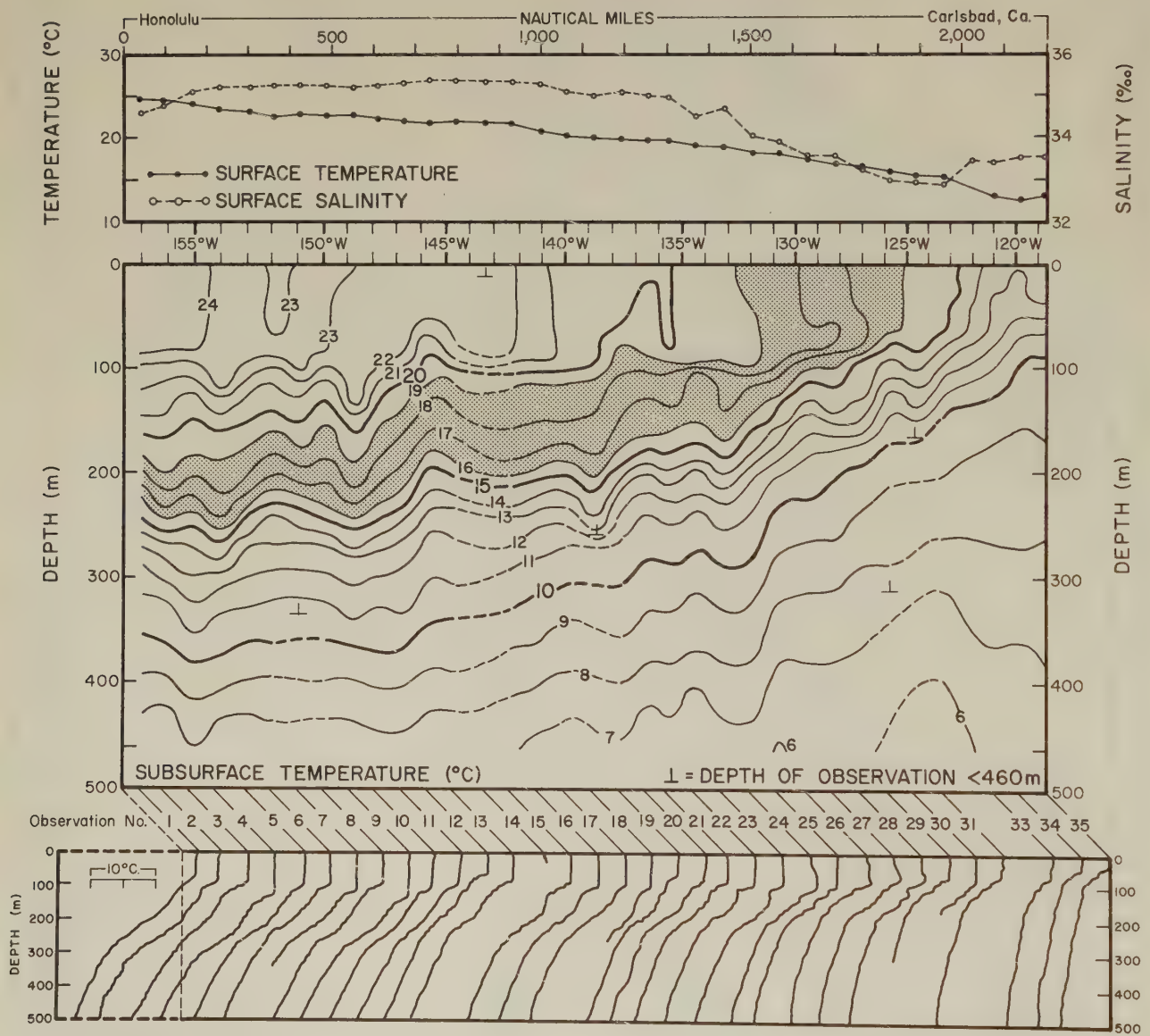
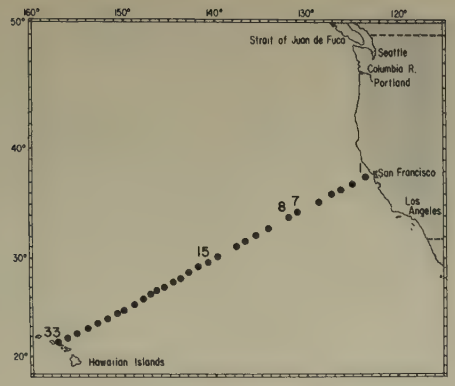
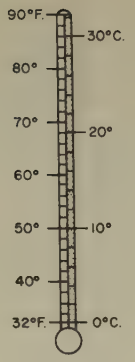


FIGURE 12



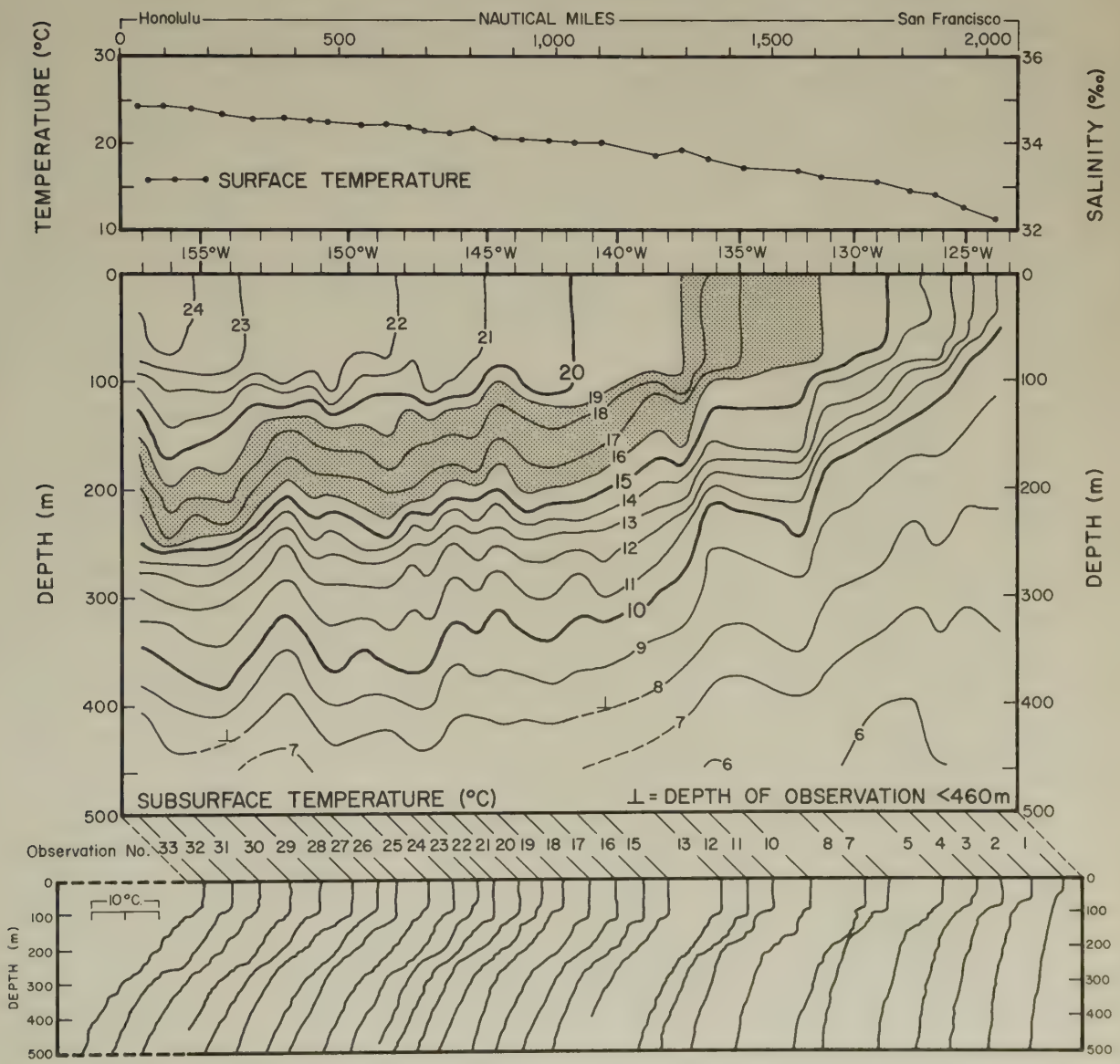


HONOLULU – SAN FRANCISCO

JANUARY 11–16, 1974

SS CHEVRON CALIFORNIA

VOYAGE 55



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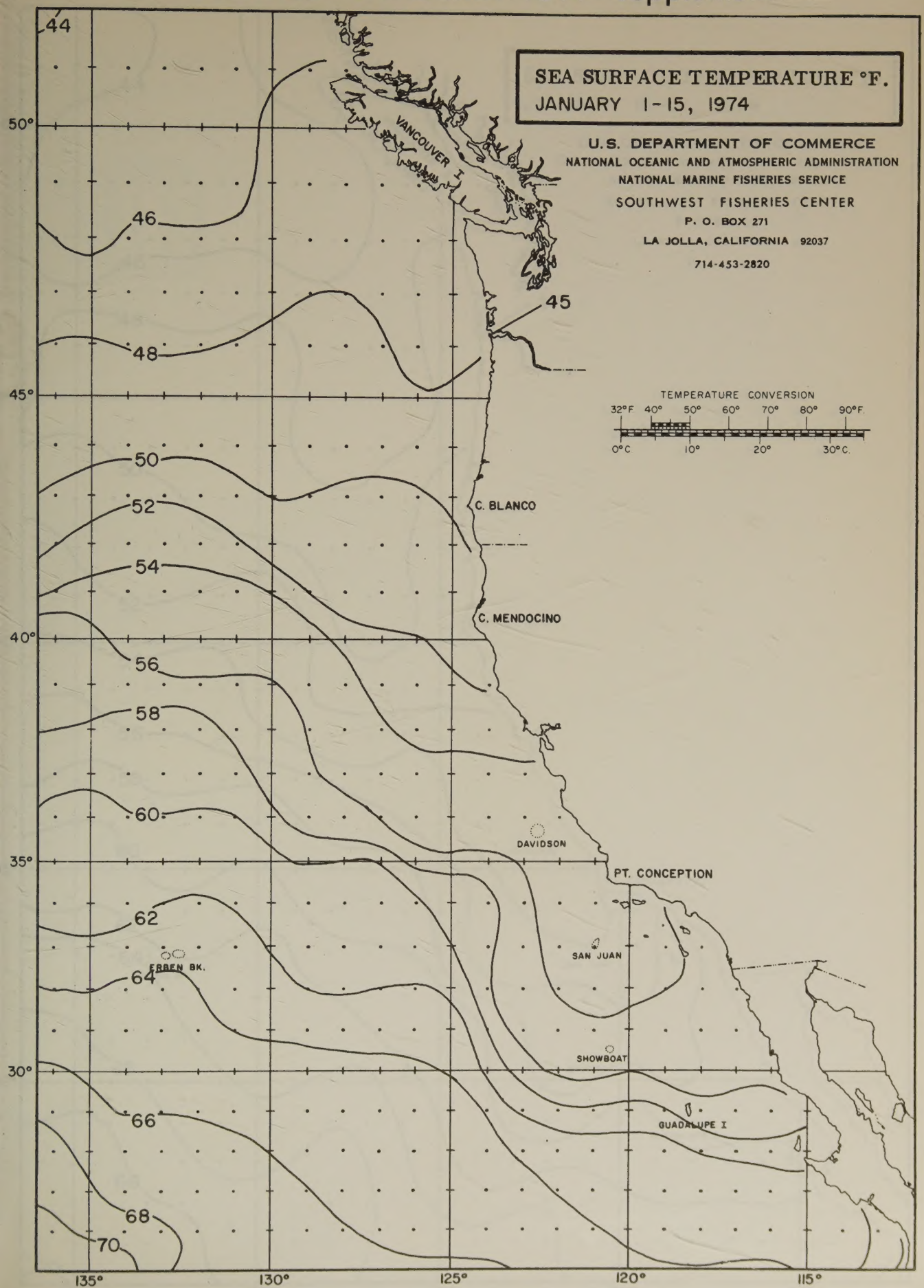

FISHING INFORMATION – supplement